2011. The Journal of Arachnology 39:523–527

SHORT COMMUNICATION

The genus *Plesiophrictus* Pocock and revalidation of *Heterophrictus* Pocock (Araneae: Theraphosidae)

José Paulo Leite Guadanucci: Universidade Federal dos Vales do Jequitinhonha e Mucuri, Departamento de Ciências Biológicas, Laboratório de Zoologia de Invertebrados, Campus JK, Rodovia MGT 367 – Km 583, n° 5000, Alto da Jacuba, Diamantina-MG, Brasil, CEP 39100-000. E-mail: joseguadanucci@gmail.com

Abstract. The genus *Plesiophrictus* is diagnosed and redescribed based on type material and additional specimens. The type species *P. millardi* (Pocock 1899) is redescribed. The genus *Heterophrictus* is revalidated, with *H. milleti* as type species. *Heterophrictus* differs from *Plesiophrictus* by the absence of serrula on maxillae and by having a rastellum on the chelicerae and stiff, spike-shaped setae on the prolateral coxae I. The significance of characters used in the taxonomy of both genera is discussed.

Keywords: Spider, taxonomy, India, Ischnocolinae, Eumephorinae, serrula

The genus *Plesiophrictus* was described by Pocock 1899 to accommodate three species (*P. collinus* Pocock 1899, *P. millardi* Pocock 1899, *P. tenuipes* Pocock 1899) from India and Sri Lanka, with *P. millardi* as the type species. As promised a year before, Pocock (1900) gave more precise descriptions of *Plesiophrictus* species in his book "Fauna of the British India" and, additionally, described the monotypic genus *Heterophrictus*, *H. milleti* as type species. According to Pocock, *Plesiophrictus* could be distinguished from *Heterophrictus* by the shape of thoracic fovea, being straight in the former, procurved in the latter. Simon (1903) diagnosed *Heterophrictus* by the presence of long setae above the suture of the prolateral face of the first coxae, the shape of thoracic fovea and the posterior sternal sigilla remote from sternal margin. Gravely (1915) stated that Pocock's distinction, based on slight differences in shape of the fovea, was very unsatisfactory. Gravely also considered the setae observed by Simon in *Heterophrictus* to be related to size and to be variable even among adults. Throughout the years, several species were included within *Plesiophrictus* without any revisionary study. In 1985, Raven considered *Plesiophrictus* a senior synonym of *Heterophrictus* and *Ischnocollela* Strand 1907, since they share all characters of generic significance, which were not mentioned by the author. Hitherto, the genus *Plesiophrictus* was comprised of 16 species distributed mainly in India and single records for Micronesia and Sri-Lanka.

METHODS

Specimens from the following institutions (giving acronym, city, and curator) were examined: BMNH – British Museum of Natural History, London, England. J. Beccaloni; MNHN – Muséum National d'Histoire Naturelle, Paris, France. C. Rollard; ZMUC – Zoological Museum, University of Copenhagen, Copenhagen, Denmark. N. Scharff.

All measurements, in mm, were taken with an ocular micrometer. The length of leg segments was measured between joints in dorsal view. Length and width of carapace, eye tubercle, labium and sternum are maximum values obtained. Total body length includes chelicerae and opisthosoma but not the spinnerets.

Terminology for the number and disposition of spines follows that of Petrunkevitch (1925), with modifications proposed by Bertani (2001).

Specimens were examined and illustrated using a Leica MZAPO stereoscopic microscope, with camera lucida. The spermathecae were cleared with carnation oil and illustrated in dorsal view. Left palpal bulbs were illustrated in pro and retrolateral views. Setae of male tibia I were removed in order to illustrate the tibial apophysis better.

For Scanning Eletronic Microscope images, the maxilla were left in absolute ethanol overnight, critical point dried and cleaned with an air spray. The material was glued to stubs with polyvinyl resin. The stubs were coated and observed under Scanning Eletronic Microscope JEOL JSM-6335F.

TAXONOMY

Family Theraphosidae Thorell 1869
Genus *Plesiophrictus* Pocock 1899

Plesiophrictus Pocock 1899:749, type species *Plesiophrictus millardi* Pocock 1899, by original designation; 1900:181; Gravely 1915:273 (part); Raven 1985:154; Siliwal et al. 2007:2853; Platnick 2011.

Ischnocolella Strand 1907:14, type species *Ischnocolella senffti* Strand 1907 by monotypy, type considered lost (Raven 1985). Synonimized by Raven 1985:155.

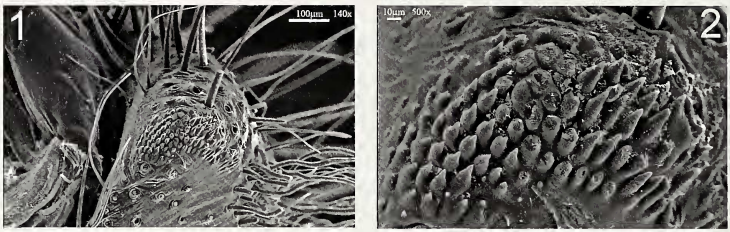
Diagnosis.—Representatives of the genus differ from those of *Heterophrictus* by the lack of stridulating apparatus or scopula on coxae or chelicerae and by the presence of serrula on the prolateral face of the maxillary lobe (Figs. 1, 2). Males can be recognized by the presence of short spines between the two tibial apophysis branches (Fig. 4).

Description.—Chelicerae without rastellum. Cephalic region weakly raised. Eye tubercle weakly raised, small. Anterior eye row procurved, posterior slightly recurved, clypeus absent. Thoracic fovea short, ranging from straight to slightly procurved. Labium as wide as long. Maxilla with produced anterior lobe, serrula present, cuspules on the inner angle. Posterior sternal sigilla remote from sternal margin. Cymbium with similar lobes. Tarsal scopula III–IV divided by a longitudinal band of thick setae. Superior tarsal claws without teeth, inferior tarsal claws absent, claw tufts well developed. Clavate tarsal trichobothria in two short rows, separated by a line of long and thin setae. Retrolateral scopula on femur IV absent. Stridulatory setae absent on coxae and chelicera. Urticating hairs absent. Posterior lateral spinnerets three-segmented, long, apical segment digitiform. Palpal bulb with tapering embolus, which bears a long basal keel. Male tibial apophysis present, formed by two branches, metatarsus I bends between the branches. Spermathecae formed by two receptacles, with single termini.

Plesiophrictus millardi Pocock 1899
Figs. 3–7

Plesiophrictus millardi Pocock 1899:749.

Plesiophrictus satarensis Gravely 1915; Siliwal et al. 2007:2859. New synonymy.



Figures 1, 2.—*Plesiophrictus collinus*. 1. Prolateral view of distal end of maxilla, showing the serrula; 2. Serrula denticles, detail.

Type material.—Holotype male of *P. nillardi* (BMNH) from Matheran, India; Holotype male of *P. satarensis* (BMNH 2205/17) from Medha, Yenna Valley, Satara District, Bombay, 17–23 April 1912; examined.

Other material examined.—*Plesiophrictus millardi*: 1 male, India, Uran (BMNH 99.11.2.234). *P. collinus*: holotype female, India, Yercaud (BMNH); 3 females and 1 juvenile, India, Madras, 21 December 1923 (BMNH); 1 female and 1 juvenile, India, Madras, R. Sherriffs leg., 20 November 1960 (ZMUC 635); 1 female, India, Vellore, Lowenthal leg., 24 April 1986 (ZMUC 624); 1 male, 2 females and 1 juvenile, India, Vellore, Lowenthal leg., 24 April 1986 (ZMUC 625). *P. sericeus*: holotype female, India, Poona (BMNH 99.11.2.116-117); 1 female, India, Poona (BMNH 99.9.21-161). *P. tenuipes*: holotype female, Sri Lanka, Kandy, Yevtriny leg. (BMNH 98.3.21.4).

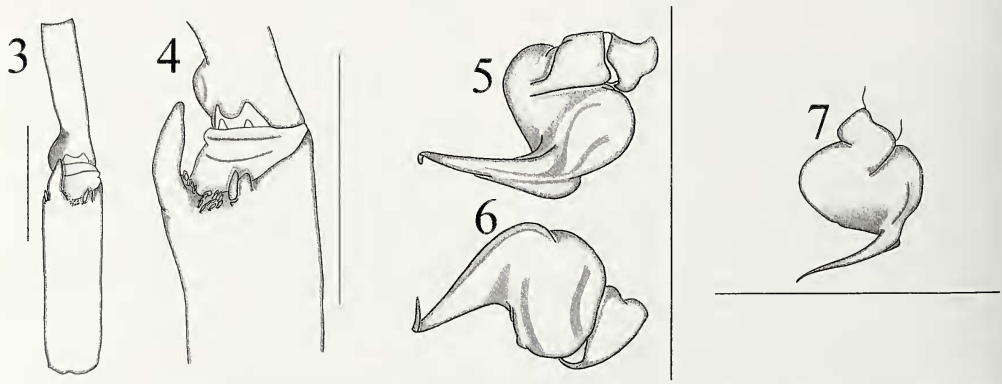
Diagnosis.—It differs from the other species by the aspect of retrolateral branch of tibial apophysis (Figs. 3, 4), and by the helicoidal torsion of embolus on male palpal bulb (Figs. 5–7). Females unknown.

Description.—Male (holotype). Total length 14. Carapace: length 5.5; width 43. Eye tubercle: length 1.9; width 0.9. Labium: length 0.5; width 1. Sternum: length 2.5; width 2.4. Cheliceral basal segment with 9 teeth. Labium as wide as long with 14 cuspules. Maxilla with more than 45 cuspules, serrula present. Labiosternal suture with two distinct mounds. Sternum rounded, posterior sigilla remote from sternal margin. Thoracic fovea short and straight. Palp: femur 2.9/ patella 1.8/ tibia 2.2/ cymbium 1/ total 7.9. Legs I: femur 4/ patella 2.6/ tibia 2.9/ metatarsus 2.6/ tarsus 1.7/ total 13.8. II: 3.4/ 2.1/ 2.3/ 2.1/ 1.6/ 11.5. III: 3.1/ 1.8/ 1.8/ 2.2/ 1.6/ 10.5. IV: 4.2/ 2.2/ 3.2/ 3.4/ 1.9/ 14.9. Spines: Tarsi without spines. Palp without spines. Legs: I: metatarsus (v) ap1. II: tibia (v) ap2, (p) 0-0-1, metatarsus (v) ap1. III: patella (v) ap1, (p) 1, tibia (v) 1-1-ap3, (p) 2-2-0, (r) 1-1-0, metatarsus (v) 3-1-ap3, (p) 0-1-1, (r) 0-1-1. IV: femur (d) 0-0-r1, tibia (v) 2-2-ap3, (r) 0-1-1, metatarsus (v) 2-2-ap3, (p) 0-1-1, (r) 0-1-1. Male palpal bulb with tapering helicoidal embolus, bearing a basal long keel (Figs. 5–7). Tibial apophysis formed by two branches. Prolateral short with adjacent spine. Retrolateral bearing a spine inserted at midlength (Figs. 3, 4). Presence of several short spines between apophysis branches (Fig. 4). Metatarsus I straight, small retrolateral basal nodule, bends between two branches. Scopula on metatarsi: I–III apical half, IV less than apical half. Scopula on tarsi: I undivided, II undivided with a longitudinal band of setae, III–IV divided by a longitudinal band of thick setae. Superior tarsal claws without teeth, clavate trichobothria in two short rows divided by a line of long and thin setae. Eyes: anterior row procurved, posterior slightly recurved.

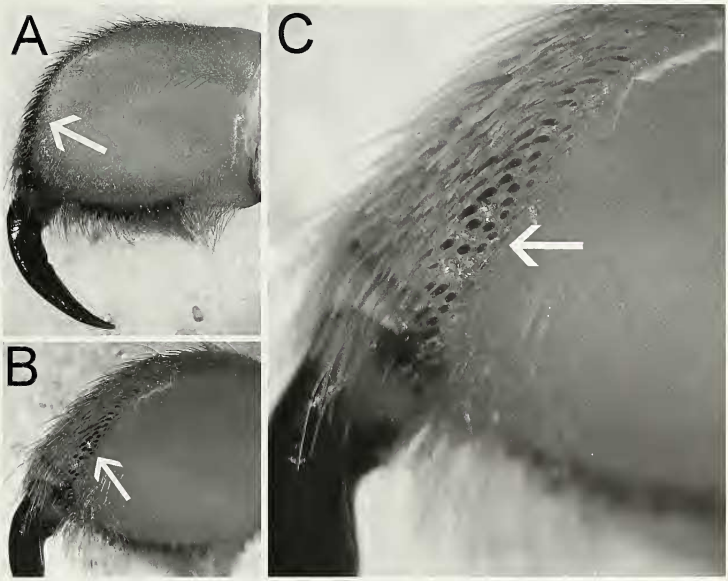
Genus *Heterophrictus* Pocock 1900

Heterophrictus Pocock 1900:180, type species *Heterophrictus milleti* Pocock 1900, by monotypy.
Plesiophrictus, Raven 1985:154 (synonymy, here rejected).

Diagnosis.—Representatives of the genus differ from those of *Plesiophrictus* by the presence of rastellum formed by a line of short spines on inner margin of dorsal surface of chelicerae (Fig. 8A–C) and stiff, spike-shaped setae above the suture on the prolateral coxae I (Fig. 9 A–C), and by the absence of serrula.

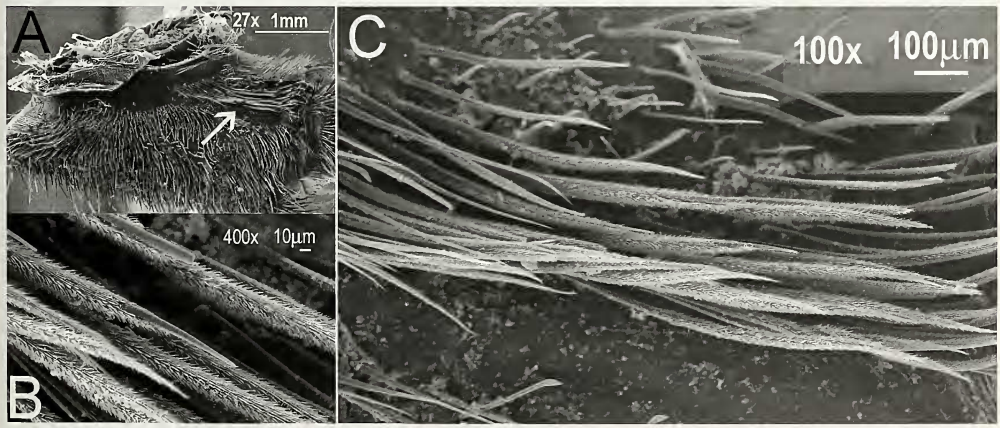


Figures 3–7.—*Plesiophrictus millardi*, Male holotype. 3. Tibial apophysis, ventral view; 4. Tibial apophysis, ventral-prolateral view; 5. Palpal bulb, prolateral view; 6. Palpal bulb, retrolateral view; 7. Palpal bulb, dorsal view. Scale = 1mm.



Figures 8.—A–C. *Heterophrictus milleti*, right chelicerae: A. Prolateral view; B. Prolateral-frontal view; C. Detail of rastellum. Arrows showing rastellum.

Description.– Chelicerae with rastellum formed by a line of short spines on inner margin of dorsal surface of basal article. Cephalic region slightly raised. Eye tubercle weakly raised, small. Anterior eye row procurved, posterior slightly recurved, clypeus absent. Thoracic fovea straight or procurved. Labium as wide as long. Maxilla with produced anterior lobe, serrula absent, cuspules on the inner angle. Posterior sternal sigilla remote from sternal margin. Cymbium similar lobes. Tarsal scopula I–IV divided by a longitudinal band of thick setae. Superior tarsal claws without teeth, inferior tarsal claws absent, claw tufts well developed. Clavate tarsal trichobothria in two short rows, separated by a line of long and thin setae. Retrolateral scopula on femur IV absent. Stridulatory setae absent on chelicera. Stiff, thick, plumose setae above the suture on the prolateral surface of the coxae I (Figs. 8, 9). Urticating hairs absent. Posterior lateral



Figures 9.—A–C. *Heterophrictus milleti*: A. Maxilla, prolateral view, showing stiff setae; B. Detail of setae apex; C. Detail of stiff setae.

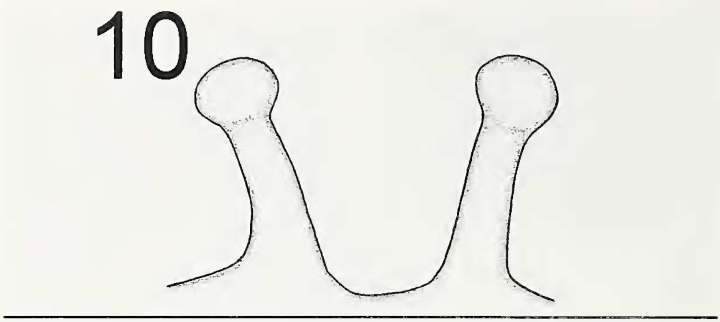


Figure 10.—*Heterophrictus milleti*, holotype female, spermathecae, dorsal view. Scale = 1mm.

spinnerets three-segmented, long, apical segment digitiform. Spermathecae formed by two receptacles, with single or multi termini.

Heterophrictus milleti Pocock 1900
Figs. 8–10

Heterophrictus milleti Pocock 1900:180.

Type material.—Holotype female (BMNH 99.9.21.162-3) from Násik, India; examined.

Other material examined.—*Ischnocolus linteatus*: holotype female, India, Pondichery (MNHN 5369); 1 female, India, Pondichery (MNHN 5372). *Plesiophrictus bhori*: paratype female, India, Parambikulan, 16–24 September 1914 (BMNH 16.5.2.16). *Plesiophrictus rajo*: paratype female, India, Bombay, Helvak, Koyna Valley, Satara, 28–30 April 1912 (BMNH 16.5.2.15); paratype female, India, Kavalai, Kavali, 24–27 September 1914 (BMNH 16.5.2.17).

Diagnosis.—Females of *H. milleti* are distinguished by the spermathecae formed by two receptacula with a single terminus (Fig. 10) and by the thoracic fovea clearly procurved. Males unknown.

Description.—Female (holotype). Total length 20.6. Carapace: length 6.7; width 5.5. Eye tubercle: length 0.8; width 1.2. Labium: length 0.8; width 1.3. Sternum: length 3.1; width 3.1. Cheliceral basal segment with 13–14 teeth, rastellum formed by several short spines along the inner edge of dorsal cheliceral basal segment. Labium wider than long with 25 cuspules. Maxilla bearing nearly 80 cuspules, serrula absent. Labiosternal suture with two distinct mounds. Sternum rounded, posterior sigilla remote from sternal margin. Thoracic fovea procurved. Palp: femur 3.1/ patella 2.2/ tibia 2/ tarsus 1.8/ total 9.1. Legs I: femur 4.2/ patella 3.1/ tibia 3.1/ metatarsus 2/ tarsus 1.3/ total 13.7. II: 3.6/ 2.6/ 2/ 1.9/ 1.3/ 11.4. III: 3.1/ 2.2/ 1.8/ 2.5/ 1.6/ 11.2. IV: 4.6/ 2.7(tibia, metatarsus and tarsus IV missing). Spines: Tarsi without spines. Palp: tibia (v) ap1. Legs: I: metatarsus (v) ap1. II: tibia (v) ap1, metatarsus (v) ap1. III: patella (p) 1, tibia (v) 0-1-ap2, (r) 0-1-0, (p) 0-1-0, metatarsus (v) 0-2-ap3, (p) 0-1-1, (r) 0-1-1. Spermathecae formed by two long receptacula with distinct apical lobe (Fig. 10). Scopula on metatarsi: I–II apical half, III apical 1/3. Scopula on tarsi: all scopula divided. Superior tarsal claws without teeth, clavate trichobothria in two short rows. Eyes: anterior row procurved, posterior slightly recurved, clypeus absent.

DISCUSSION

Pocock (1900) used the shape of thoracic fovea to distinguish between *Plesiophrictus* and *Heterophrictus*. Although it is possible to distinguish the type species of the two genera, the examination of additional specimens of *Plesiophrictus* and *Heterophrictus* showed that this character is variable, in agreement with Gravely (1915).

Simon (1903) used the shape of thoracic fovea to diagnose both genera, but he also noted the presence of long setae on the prolateral surface of coxae I in *Heterophrictus milleti*. Scanning electron microscopy of coxae I revealed the ultrastructure of these setae. The stiff plumose setae are located above the suture of the coxae, which can be recognized under the stereomicroscope. These setae, in addition to the rastellum on the chelicera, also observed in *Heterophrictus milleti*, led me to propose the revalidation. Raven (1985) diagnosed the subfamily Eumenophorinae by the presence of long spike-shaped setae located on the prolateral coxae I at the dorsal portion. Such setae show the same morphology as those found in *Heterophrictus* (Fig. 9). Therefore, the genus *Heterophrictus* is transferred to the subfamily Eumenophorinae.

Concerning *Plesiophrictus*, the presence of maxillary serrula, which has never been reported for this genus, is an important character to diagnose the genus, along with the short spines between tibial apophysis of males.

Siliwal et al. (2007) diagnosed the genus *Plesiophrictus* based on the aspect of fovea, sternum sigilla, size of eyes and quantity of spines on legs, those of which do not warrant the recognition of the genus. The authors did not mention the characters to distinguish the two genera (presence of serrula, presence of chelicerae rastelum and coxae I with stiff setae).

Both genera discussed here are very difficult to study, because most of their species are only known from type material, which is scattered among museums in different countries. Moreover, of 16 species currently included within these genera, 10 are only known from the female.

The main purpose of this paper is to revalidate *Heterophrictus* and provide a diagnosis for *Plesiophrictus* and *Heterophrictus*. It is also important to highlight the need for a comprehensive revision of Indian theraphosids. The revision of these two genera must include all type material and the generic characters considered in the present study.

ACKNOWLEDGMENTS

I would like to thank the curators J. Beccaloni, C. Rollard and N. Scharff for having kindly hosted me during my visit to their institutions. Special thanks to Boris Striffler and Volker von Wirth for having shared information and descriptions on oriental Theraphosidae, for comments and suggestions on this manuscript. This study was carried out with financial support of CNPq (process 201036/2004-5) and it is part of the Ph.D. thesis of the author (CNPq process 142035/2003-3).

LITERATURE CITED

Bertani, R. 2001. Revision, cladistic analysis, and zoogeography of *Vitalius*, *Nhandu*, and *Proshapalopus*; with notes on other

theraphosinae genera (Araneae, Theraphosidae). Arquivos de Zoologia, São Paulo 36:265–356.

Gravely, F.H. 1915. Notes on Indian mygalomorph Spiders. Records of the Indian Museum Calcutta 11:257–287.

Petrunkevitch, A. 1925. Arachnida from Panamá. Boletín de la Sociedad Zoologica Uruguay (2° epoca) 7:11–12.

Platnick, N.I. 2011. The World Spider Catalog, Version 11.5. American Museum of Natural History, New York. Online at http://research.amnh.org/iz/spiders/catalog. (Accessed 10 February 2011).

Pocock, R.I. 1899. Diagnoses of some new Indian Arachnida. Journal of the Bombay Natural History Society 12:744–753.

Pocock, R.I. 1900. The Fauna of British India, Including Ceylon and Burma. Volume 7. Arachnida. Taylor and Francis, London.

Raven, R.J. 1985. The spider infraorder Mygalomorphae (Araneae): cladistics and systematics. Bulletin of the American Museum of Natural History 182:1–180.

Siliwal, M., S. Molur & R. Raven. 2007. A new species of the genus *Plesiophrictus* (Araneae: Theraphosidae: Ischnocolinae) from Western Ghats, India. Zoos' Print Journal 22:2853–2860.

Simon, E. 1903. Histoire naturelle des araignées. Librairie encyclopédique de Roret, Paris 2:669–1080.

Strand, E. 1907. Avicullariidae und Atypidae des Kgl. Naturalienkabinetts in Stuttgart. Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg 63:1–100.

Manuscript received 30 August 2010, revised 6 March 2011.